VOL. 2 NUMBER 2 OCTOBER 1950

Industrial HEALTH REVIEW

INDUSTRIAL HEALTH DIVISION
DEPARTMENT OF
NATIONAL HEALTH AND WELFARE
OTTAWA

OPERATION REHABILITATION

AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE EVERY HUMAN BEING IS AN INDIVIDUAL

HEALTH IMPLICATIONS OF AIR POLLUTION

INVESTIGATIONS ON DUST CONCENTRATIONS IN THE GRANITE INDUSTRY

LEAD HAZARD IN AN ENAMEL PLANT

LOST TIME IN INDUSTRY

INCREASING INTEREST IN INDUSTRIAL NURSING

A CONSIDERATION OF BASIC PERSONNEL POLICIES FOR INDUSTRIAL NURSES

CHANGING CONCEPTS IN OCCUPATIONAL HEALTH

INDEX

Operation Rehabilitation 1
Increasing Interest in Industrial Nursing 5
Lost Time in Industry 6
Health Implications of Air Pollution 7
Investigations on Dust Concentrations in the Granite Industry 12
Lead Hazard in an Enamel Plant 14
An Ounce of Prevention Is Worth a Pound of Cure 15
Changing Concepts in Occupational Health 20
A Consideration of Basic Personnel Policies for Industrial Nurses 23

Published for the Industrial Health Division of the Department of National Health and Welfare, Ottawa, under the authority of the Minister, the Hon. Paul Martin, by the Department's Information Services Division.

OPERATION *Rehabilitation*

By G. Gingras, B.A., M.D.
Director of Physical Medicine, Montreal District, D.V.A.
Medical Director, Rehabilitation Society for the Crippled

In collaboration with Maurice Mongeon, M.D., Queen Mary Veterans Hospital, Montreal

"Rehabilitation covers the entire range of treatment of the disabled from the time of accident to the point when his physical condition is restored to the pre-accident level, or at least to the fullest possible restoration." This definition quoted from the "Report of the Inter-Departmental Committee on Rehabilitation of Injured Persons in England" is, as judiciously noted by Olive Guthrie Smith, "too narrow" and it is felt that a wider concept should be applied to the term *rehabilitation*. A definition is found in "The Report of the Sub-Committee on Civilian Rehabilitation of the Baruch Committee" which reads: "The goal of rehabilitation is to achieve the maximum function and adjustment of the individual, and to prepare him physically, mentally, socially and vocationally for the fullest possible life compatible with his abilities and disabilities." Deaver finalized by stating: "The ultimate goal of rehabilitation is to achieve the maximum function and adjustment of the individual so that he may return to productive employment compatible with his abilities and disabilities." This philosophy of rehabilitation, in our opinion, does not apply to a particular group only, but to all handicapped persons whether their disability is attributable to trauma or disease, congenital or acquired.

It seems deserving to dissect these definitions, examine the various phases of both medical and social rehabilitation and at the same time review the factors which render the problem of rehabilitation of our fellow-citizens so difficult and very often almost impossible.

Physical rehabilitation of the handicapped falls into the scope of the physiatrist's activities. During and since the last world conflict, physical medicine has taken over restoration and the third phase of medical treatment of the sick or injured.

It is recognized that following injury, disease or surgical procedure, little has been done to help patients regain useful and gainful employment. After the removal of a cast or sutures from a surgical incision, or with the ingestion of the last dose of prescribed drug the patient is promptly discharged home as cured, improved or possibly not improved. Indeed, as far as many surgeons and internists are concerned, the patient is considered cured as the operation had been successful, the fracture well healed and there were no post-operative complications. But is this all that matters? Has it been taken into consideration that even if the patient is supposedly cured he still invariably goes through a period of low resistance? It is well known that following long immobilization in cast, at times there are considerable amyotrophic changes. Is it not true that even long bed rest occasions deep physiological and metabolic phenomena which prevent immediate return to normal activity?

Physical medicine has accepted the challenge to pave the way to the restorative phase. The physiatrist endeavors to continue from where the surgeon or internist stops, offers his collaboration during the acute phase of the ailment and in some cases prepares the patient physically for further surgical or medical procedures. In preventive medicine physical medicine corrects postural defects, one of the greatest problems with growing children, and at the same time offers appropriate exercises in cases of prevailing respiratory deficiency. The physiatrist is frequently called upon to prepare cases for futher treatments—massage and hydrotherapy previous to skin grafts and flap turning; active and passive mobilization preparatory to orthopedic procedures, graduated and appropriate exercises advocated pre-operatively in discoidectomy, ultra-violet and infra-red therapy. Continuous saline baths are today novel in the pre-operative care of decubitus ulcers or other atonic conditions of the skin and soft tissues. In the course of poliomyelitis muscular re-education, postural correction and walking supervision is sometimes conducted for two years before any corrective orthopedic procedures are requested or attempted. In some cases, with the completion of active surgical or medical procedures, physical medicine takes over almost completely. The following types of cases would fall in this group; cerebral palsy, disseminated sclerosis, hemiplegia, post-traumatic paraplegia, poliomyelitis, speech defects, etc. Post-operatively, the physiatrist is consulted by the plastic surgeon with reference to tight, adherent or retracted scars and for skin mobilization over extensive operative procedures.

The department of orthopedics requests treatment to stiff articulations consequent to surgical procedures or prolonged immobilization in cast. The physiatrist

collaborates with dermatology, E.N.T., internal medicine and tuberculosis services in the application of ultra-violet therapy. Neurosurgery refers nerve sutures for electrical stimulation and muscle testings. Recently many arthritic cases have been treated in physiatry. Physical medicine has a great deal to offer to geriatry through the occupational therapy department. There is a minimum of early deterioration and disciplinary problems when the aged, particularly domicilliary cases, are kept interested and occupied.

A broader field has been opened to physical medicine since the war. Its activities are confined to the physical aspect of the patient as well as his general welfare. When dealing with long term illnesses, the patient's mind as well as his body is under a strain because of disturbance in his general condition and radical changes in surroundings and atmosphere. Rarely does a long term patient enter a hospital, sanatorium or rehabilitation centre without leaving behind a few unattended problems. Experience shows that the most pressing and anxious problems are financial or familial. Indeed, how can the patient have peace of mind and conscientiously follow a retraining program if completely isolated from his family and worried about the welfare of his wife and children? Even today, there are very few institutions where one can find a competent staff to help work out these questions, give financial advice concerning insurance, pension, compensation and social problems arising during and out of the course of the treatment. In these cases physical medicine associated with sub-services becomes an entity and associated to its name the term *Rehabilitation*. It is worthy of note that in veterans administration hospitals in the U.S.A., physical medicine and rehabilitation are synonymous and the chief of physical medicine is referred to as the chief of physical medicine rehabilitation.

It comes to the minds of many that physical medicine, as service which usually takes over cases after the acute phase of illness, is the most suitable and best equipped service to guide and see the patient to maximum readaptation to society. It seems that the physiatrist, assisted by a group of capable co-workers, is most qualified to direct and coordinate what we may term "Operation Rehabilitation" as only a physician can evaluate the degree of disability and consequently lead the patient through the proper channels of rehabilitation. Physiotherapy, though essentially a physical measure, is recognized as a great morale builder, particularly by the handicapped patient. Schedules of the patient's daily activities should always be drawn up. Responsibility in his own treatment and progress is fortified through the patient's regular attendance and observance of a strict routine.

Occupational therapy provides two phases in the rehabilitation scheme—diversional and remedial occupational therapy. The former absorbs the patient's

free time by providing interesting manual work. Needless to say, this form of therapy, although recommended for diversional purposes, has played a significant part in orienting many patients towards new fields of activity following discharge from the hospital. Remedial occupational therapy is a transposed form of physiotherapy where physical activity concentrated on the impaired member or function is prescribed to obtain improvement or restoration of the function. Remedial occupational therapy is, in a broader sense, any mental or physical stimulation which contributes to the recovery of the patient. This may even embrace some form of sport or entertainment and is greatly favored in the rehabilitation of mentally handicapped cases. Occupational therapy has a leading role in restorative medicine because of the extent of its diverse activities which add to the treatment a colorful and most interesting curative adjunct. This department's value and services are unfortunately unrecognized, as proven by the number of institutions in eastern Canada without adequate or acknowledged occupational therapy departments staffed by university-trained therapists. The department of occupational therapy can be invaluable in the future through the application of its diverse knowledge and experience as well as the provision of adequate facilities for the pre-vocational training of patients while still in hospital. Various other forms of therapy are now accepted in well-organized centres as essentials in the rehabilitation scheme and as great morale builders.

Educational therapy applied to long term patients, the disabled in particular, has demonstrated great value. As occupational therapy but in a different sphere, it utilizes resources which increase the general knowledge of the patient and prepares him for employment upon discharge from hospital. In the event of a permanent incapacity this department directs the patient's interests and knowledge into new fields thus occupying one of the most important roles in the rehabilitation of the sick or injured.

Social adjustment of the handicapped is undoubtedly the most important and difficult problem faced by rehabilitation councils.

The patient is faced with a thousand and one problems as soon as he leaves the security and protection of the hospital and staff.

First: *An inferiority complex often prevails, particularly when there is added physical deformity.*

Second: *A feeling of rejection by the community or family because of radical changes in his former capacities and possibly cosmetic appearance.*

Third: *Fear of financial insecurity due to non-existent suitable employment.*

These problems were rarely if ever considered in the past when effecting a discharge from hospital. Inevitably this resulted in a considerable loss of time before action, by which time the patient was invariably discouraged and very pessimistic about his future.

The primary axiom should be kept in mind at all times: "Rehabilitation starts at the moment of injury." Apart from being interviewed, examined and assessed by the physician, the patient must be visited by the medical social service worker as soon as possible after admission. These first interviews during the acute phase of treatment are to make the patient's acquaintance, outline the function of the rehabilitation centre and explain the role of the different departments in the program. At the same time the patient has an opportunity to disclose his immediate needs, worries and problems which frequently can be cleared up for him. These interviews have been of extreme value in gaining the patient's confidence and preparing him to adjust himself to his new condition. Needless to say the family is seen and visited, social and family backgrounds of the patient are studied, his activities within the community are checked, financial status is brought forward and in a short time the rehabilitation group is in full possession of all necessary details to establish a sound campaign. This assures the patient and his family that the individual's rehabilitation is under consideration from every angle and not only the physical and medical aspect. This work continues throughout the entire rehabilitation period, especially when the prognosis is definitely established and concrete plans laid for the future. Should the patient require prosthetic appliances in future, he should in time be approached tactfully and with due understanding helped to recognize and accept the need of these appliances to enable him to reach his maximum independence despite his disability. There must be no misunderstanding about the patient's readiness for discharge or the extent of recovery to be expected. Consciously or subconsciously he is far from ready to face a permanent disability or limitation of his former activities for many long months. Timing must be perfect and tuned with the patient's progress, physically and mentally. However, most of the rehabilitation procedures, with the exception of outside interviews by the medical social service, have been conducted within the rehabilitation centre. There must be a liaison to establish direct contact between the patient, the rehabilitation group, the community and employment. This is the responsibility of the rehabilitation officer who has knowledge of the patient's disability and is familiar with employment and placement facilities. He can foresee, judge and help overcome the obstacles thrown into the path of the handicapped patient. Aware of the restrictions imposed in each case due to physical disability, family and educational background, the rehabilitation officer is armed to contact industry and find suitable employment for the referred case.

It is imperative that all rehabilitation procedures be followed along similar lines in every instance and not be tackled by any one individual. They should be the responsibility of a team comprising the physiatrist, the physio- and occupational therapists, medical social workers, education and welfare officers and rehabilitation officers.

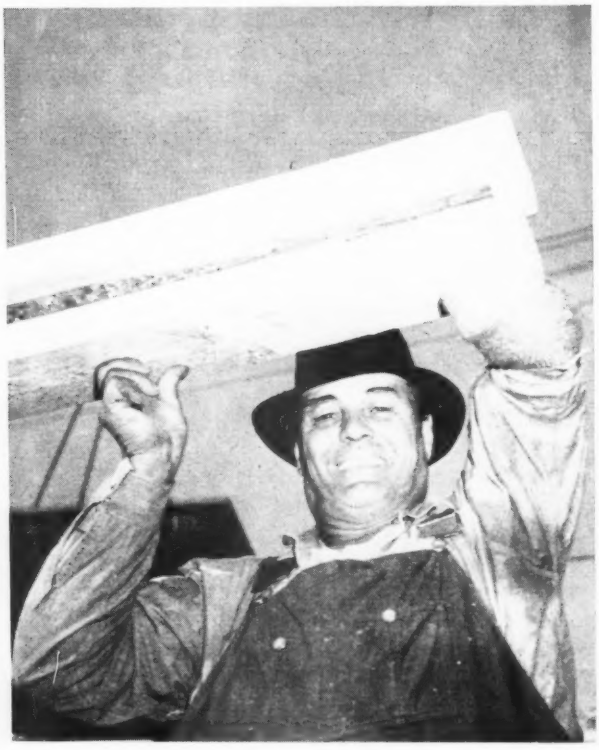
Of course such a plan runs into many difficulties and only major problems can be dealt with in this paper. One of the greatest obstacles is the lapse of time between the acute phase of treatment and the commencement of rehabilitation. Patients are referred from general hospitals by social agencies, welfare organizations and private individuals. Frequently they have spent a long period of inactivity at home with a waste of many long months until a state of boredom, discouragement or inertia is reached which renders the problems of rehabilitation extremely difficult. This does not take into consideration any extensive physical damage wrought by complete inactivity.

The answer to this is relatively simple. In most of our hospitals the patient receives the best medical and surgical supervision, but this is the extent of the services offered and at no time after admission or during the course of hospitalization is he approached about future plans with reference to his return to former employment. Furthermore, acceptance by the family and community of a patient with a marked disability is of little or no consequences as long as the actual and strictly medical treatment is successfully conducted.

General hospitals need not only a department of physical medicine but a department of physical medicine rehabilitation. Of course, it is not expected that the full rehabilitation be initiated and completed in general hospitals, but at least the patients with minor ailments could be handled on the spot and candidates for long term illnesses prepared for rehabilitation centres. If such arrangements were in effect in general hospitals not only would cases be admitted to rehabilitation centres without deformities and preventable conditions but they would have a better outlook for the future and

be ready fo fit into a more active physical medicine rehabilitation program. Furthermore it seems unfortunate that Canadian universities do not generally offer courses and training in physical medicine rehabilitation.

The educational background of the patients complicates their rehabilitation schedule and makes it very arduous. It is undeniable that the highest percentage of the "severely handicapped" come from industry. Investigation shows that education in this group is very low with an average schooling of only third or fourth grade. Of course it is preferable to direct the injured worker back to his former occupation, but it remains impossible to retrain a blind miner in his own trade or return the steel worker to the plant with loss of both legs. The rehabilitation group is therefore faced with the problem of training the patient towards a new occupation, as similar as possible to that which he held previously, although this may require a great deal of further technical knowledge. Lack of basic education is one of the greatest impediments in rehabilitation.



Financial problems create great difficulties for those who have the patient's welfare at heart. It has been proven again and again that workmen who have become invalids and classified as totally and permanently disabled cannot, under any circumstances, earn money to add to the family income or attend to their own personal welfare. An injured worker having the full use of his arms but deprived of use of both legs must not remain idle and on the brink of the world of normal individuals. He can undertake a useful and gainful occupation and with this assurance regain his independence and a cheerful outlook. It is a better economic and social asset and investment for the community to have one of its members secure a better standing for himself and his dependants than to remain in a state of idleness and helplesness which can lead to nothing but discouragement. Furthermore, how can this same worker educate his children and help them to become responsible citizens if he is unable to work for fear of loss or gross reduction in his small pension assistance? It is felt that once a permanent total disability has been assessed on solid medical grounds, the pension granted for such disability should remain stable even if the patient undertakes some employment to supplement the family income.

Financial problems also prevail among the severely handicapped and indigent persons, most of whom end up in homes for the incurable where they become burdens on the taxpayers and occupy beds which could be used for more useful purposes than harboring rehabitable cases All severely injured persons are not rehabitable, but it is surprising what a large number of them are, with the application of proven means and facilities.

Not so long ago a young man suffering from a great disability was admitted to a rehabilitation centre. This man had been completely inactive in a nursing home for many years. Within a period of 12 months he became not only completely independent but managed to raise his educational level to grade ten. However, when his discharge was due, in spite of encouragement received from government authorities, funds were not forthcoming for his subsistence during the course of his post-discharge studies. Fortunately a private society stepped into the picture and assumed responsibility for his maintenance. Nevertheless, if it had not been possible to find and tap this resource, the money and time invested in his retraining and treatment would have been a loss in every respect. Retraining facilities for handicapped individuals in this country are extremely limited, almost absolutely nil, when dealing with indigents.

It is easy to visualize that with modern medical and surgical knowledge and the increase in life span there will be a time when the number of chronically ill and handicapped individuals will be dramatically augmented necessitating an increased number of beds in nursing homes and causing crowding in active hospitals. This increase in chronics will cost the able-bodied population enormous taxes and in no time each normal individual will be burdened with the additional support of another person.

Laments and complaints from the medical profession and those interested in rehabilitation might not carry much weight to the economist, but facts and figures cannot be ignored when dealing with the question of an expenditure of several millions of dollars for

homes for incurables or an investment in the reinstatement of the majority of this same group of people in useful occupations.

May I mention another factor which complicates the placement of handicapped? Undeniably, many employers feel that the crippled worker has no place in industry and do not appear to understand that a well-trained, rehabilitated and suitably placed individual, because of his disability, will be more conscientious, able and loyal than the average person. When placing a disabled worker abilities and capabilities are taken into full consideration and the individual is recommended for work which he is perfectly able to perform.

It is not necessary to repeat the experiments of an internationally known firm to stress this point. The disabled, because of their limitations and infirmity, having to compete with so-called better individuals apply more care, thought, diligence and time, if necessary, to reach a better result and higher standard of work.

Without any difficulty I can name 150 rehabilitated but severely disabled workers who are now independent and engaged in useful occupations. Let us surmise that if these patients were in nursing homes at the rate of $3.00 per day, the total daily cost of the 150 persons would be no less than $450 and $3,150 for only one week. The taxpayer, therefore, invests $163,800 in one year, on 150 disabled persons.

A physical medicine rehabilitation centre could be built in a short time if this money were allotted to this purpose. This would be a permanent institution and with appropriate assistance, monetary and otherwise, a great financial economy would be realized, and a worthwhile and sound investment would be made in fellow-citizens.

The goal of this paper was to describe the role of physical medicine rehabilitation as applied to the severely disabled. I have also pointed out that rehabilitation difficulties do not lie primarily within the patient but in the limited understanding of the situation and the complications therewith.

Division of Industrial Hygiene
Ontario Department of Health

Increasing Interest in INDUSTRIAL NURSING

Recent evidence of growing interest in industrial nursing has been seen in Toronto. During the period January-March 1950 the health supervisors of the staffs of the training schools for nurses of three of the large city hospitals were enrolled in the industrial hygiene section of the general course in public health nursing held at the University of Toronto School of Nursing.

Another indication of this growing activity in industrial hygiene is the request by student nurses in the graduating year of a number of hospitals for information regarding industrial nursing. Presumably interest has been aroused through contact with nurses already engaged in this field.

Efforts have been made during the last few years to grant these requests. In Toronto assistance has been provided by the consultant nursing staff of the Division of Industrial Hygiene, Ontario Department of Health, who have outlined the subject for the health supervisors on the teaching staff of several city hospitals. In other centres the local industrial nurses have participated in the program. Sometimes the information is given to the instructor; in certain cases a lecture has been given to the students by an industrial nurse. Frequently arrangements are made for the student nurses to visit local industries to become acquainted with some phases of industrial life.

LOST TIME *in industry*

Division of Industrial Hygiene
Ontario Department of Health

A COMPARATIVE SURVEY

In an endeavor to obtain local figures on lost time and calls to the medical center, which are comparable from one industry to another, a joint effort has recently been undertaken by the Division of ndustrial Hygiene and the Medical Statistics Branch, Ontario Department of Health. The Medical Statistics Branch is giving the technical assistance in setting up the procedure and the Division of Industrial Hygiene is introducing it to industry.

For this purpose four systems are designed depending on size of plant and tabulation equipment available. The first is a simple hand-tabulation system for the recording of illness and accident absences of one day or more. It is best suited to industries of about 500 employees or less.

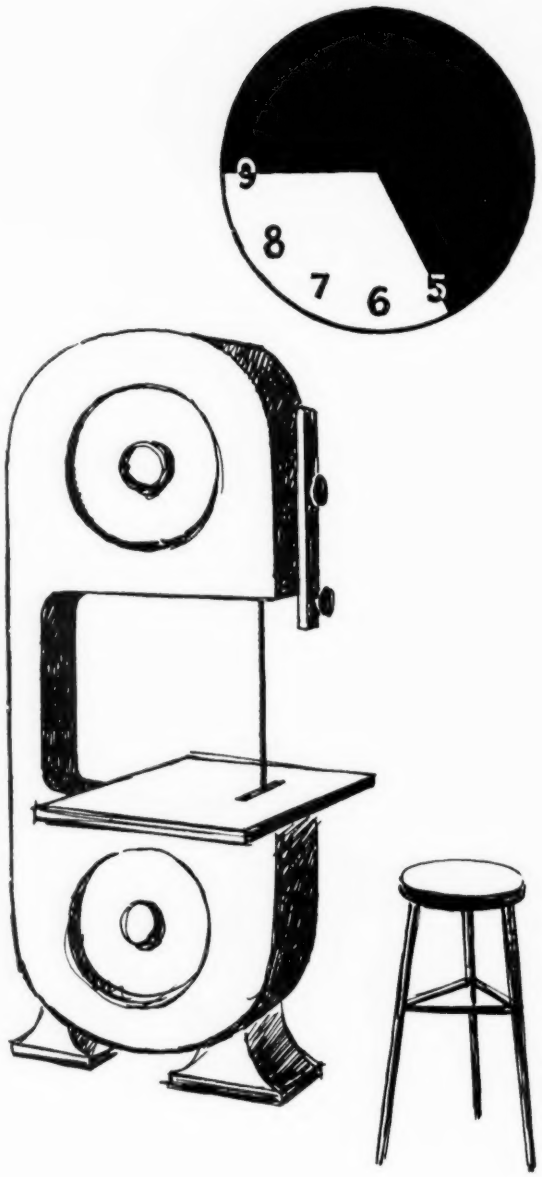
The second is a marginal punch card system which can be used to compare occupational and non-occupational sickness and accidents by age, sex, department and duration. This system can be used by industries with less than 1000 employees.

The third system is like the second, except more detailed, being designed for use with a dual-purpose punch card for machine punching and sorting. This system may be used for plants of any size which have access to machine tabulation equipment.

The fourth system is one for the recording of calls to the medical center and will also provide a comparison of occupational and non-occupational sickness and accident calls.

The second, third and fourth systems will summarize the diagnoses according to the *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*, W.H.O. 1948.

To date four plants have undertaken to record all disabling absences on marginal punch cards. Two plants have begun to use the dual purpose punch card system. Much interest in this recording system has been expressed by a number of industries in the province.



Health Implications of Air Pollution

By J. J. Bloomfield, Sanitary Engineer Director
Assistant Chief, Division of Industrial Hygiene, U.S. Public Health Service, Washington, D.C.

The origins of the problem of smoke pollution date back far beyond the modern industrial era. No one is better acquainted with this fact than the Smoke Prevention Association of America. Although the problem itself is an old one, the health implications have been the object of much scientific and lay concern throughout the country in the past year. Because of the concentrated attention that has been focused on the health aspect lately, I shall confine my remarks to this particular phase of the problem.

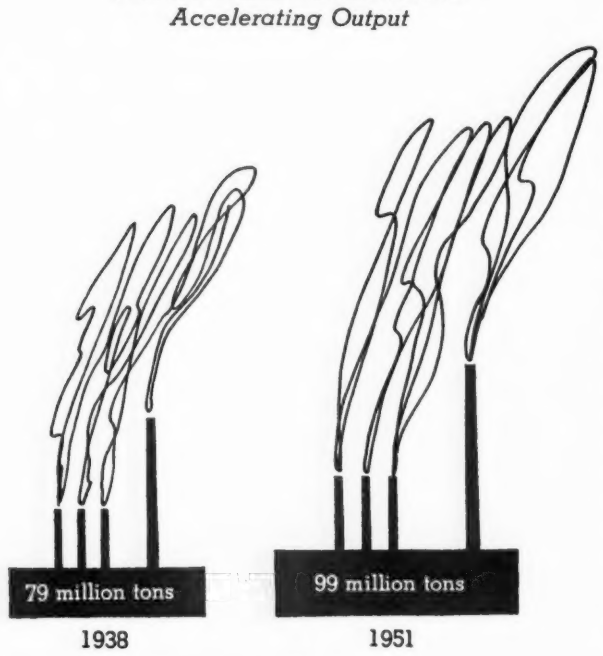
Despite early concern with air pollution, it is only recently that we have been forced to realize that there were health implications inherent in the problem. Even our understanding of the nature of air pollution has antedated this realization by less than a score of years. For it has been only within the last two decades that we were able to put the problem under a microscope, so to speak, and to analyze its component parts. Today we know that air pollution embodies more than the smoke aspect which was recognized first. We know that we must also consider the dusts, fumes, vapors, mists and other contaminants that are emitted from industrial plants. We have found that the latter, by far, make up the more complicated phase of the problem, because they do not lend themselves to a uniform solution.

The control of smoke is well understood. Smoke abatement measures are based generally on the use of only nonvolatile or low volatile fuels, or on the use of specially constructed furnaces which assure complete combustion. But they do not solve the whole pollution problem. To rid the atmosphere of the contaminants spewed into it by countless industrial operations calls for numerous and varied methods. The smelters of zinc plants alone emit such particulate matter as zinc, lead, cadmium, sulfur and chlorine, as well as gaseous substances like sulfur dioxide, carbon monoxide and carbon dioxide. When you consider the vast number of industries using raw materials and intermediate products which produce an ever greater number of contaminants, as well as the millions of homes and transportation vehicles which contribute to air pollution, you cannot escape realization of the magnitude of the problem.

Unless we take prompt action we may expect an intensification of this problem through our constantly-accelerating production. The steel industry, for instance, expects to produce in 1951 almost 99 million net tons of ingots, an increase of almost 20 million tons over 1938 production. To produce that much steel means that every minute an estimated 250 tons of iron ore and 203 tons of coal will be used.

As we undergo the tremendous growth in a variety of industrial activity in the next half century—as presaged by the increasing use of ionizing radiation, the development of plastics and a host of other synthetic products and processes, and the attempt to harness atomic energy for peaceful pursuits—it is imperative that we take proper precautions to control the resulting pollutants lest we become victims of our growth.

Even our expected increase in population presents a difficulty for people, as well as contaminants and certain meteorologic conditions, are factors of the air pollution problem. The congestion of population and concentration of industries are reflected in voluminous literature describing the economic and nuisance effects of air pollution. In addition to these considerations has come the awareness—and whether or not it is justified in every instance remains to be proven—that air pollution is affecting the people's sense of well-being; the realization that it transcends the nuisance stage and has more than economic and esthetic implications.



Extent of Present Knowledge

Much speculation has been voiced over the effects of air pollution on the course of tuberculosis, its deleterious effects in shutting out the germicidal rays of the sun, and other theories. You may remember that in his paper *Health Aspects of Air Pollution* presented at your 42nd annual conference, Dr. A. J. Lanza told of loose claims that atmospheric pollution has an effect upon the incidence of respiratory cancer. He pointed out that there is not enough evidence to substantiate these conclusions. Dr. Lanza, in the course of his talk, made a plea for a "considered and intelligent viewpoint in the matter of atmospheric pollution", and I want to try to achieve just that. Let us leave conjecture aside for the moment to review some hard, cold facts.

The first major piece of evidence of the health implications of air pollution came in 1930 when the Meuse Valley in Belgium was blanketed by a heavy smog and 60 persons lost their lives. Prolonged stable weather conditions had bottled up the contaminants in the valley for about four days and the chemical concentrations kept building up until they had reached fatal proportions.

We were to encounter similar meteorologic conditions 18 years later, in October 1948, in Donora Pennsylvania, where almost 6,000 persons were affected, 20 of them fatally. In both instances the affected communities, lying in bowl-shaped valleys where contaminants could be confined easily, experienced a meteorological phenomenon known as an inversion. At such times the temperature of the air at ground level is less than that of the air above it whereas normally the reverse is true. This stable condition minimizes the vertical mixing of the air that normally takes place and the absence of strong wind currents keeps horizontal dispersion at a minimum. In Donora these conditions lasted four and one-half days. Had they lasted only a few hours or a day or so the results, of course, would have been different, for short periods of smog are not uncommon and present no danger of wholesale sickness or death. It is the prolonged smog that may have a disastrous aftermath.

Although the term "smog" originally meant a combination of smoke and fog, its connotation now includes all kinds of fumes, gases and other emissions, in addition to particulate matter. The duration of a smog, as we have seen, is dependent on meteorological conditions. Ordinarily a wind or cleansing rain will come to sweep away the contaminants before they reach dangerous concentrations, but we have sufficient reason now to believe that the weather can be a bad actor and common sense dictates that we be ready for any such eventuality.

Aside from these dramatic acute episodes, we find in various areas periodically recurring smogs with disagreeable effects. In Los Angeles, for instance, about ten to twenty times a year smogs cause severe lachrymation as well as irritation of the nasal passages of the residents. The Los Angeles situation, by the way, affords one of the best examples of the distinction between smoke and industrial emissions in the etiology of air pollution. The City of Los Angeles burns oil and gas—there is no smoke problem as such—yet it has a terribly real air pollution problem.

More serious effects of contaminants on health may be illustrated by findings of investigations of the plant working environment, which can be more closely controlled than those of the general atmosphere. Lung disease has been shown to result among employees exposed to beryllium compounds. In some areas it has been alleged that even people living near beryllium plants have been affected. Investigations have also pointed up the occurrence of pneumonia in manganese plant areas.

To give you more details on the health implications of air pollution I'd like to be a little more specific about what we found in the Donora study. That was an investigation with which our whole division was intimately concerned for one year and I can speak on it from personal observation. I know that Dr. Helmuth Schrenk, who was in charge of the investigation, spoke at your last meeting about the methods and procedures used in this study. But I should like to tell you about some of the findings which were as yet unpublished when Dr. Schrenk spoke. The salient points in the biological data that I believe would be of most interest to you are the incidence and severity of illness during the smog, the main clinical manifestation and the significant relationships between the affection and other factors.

The illness graph showed that 43 % of the population were affected, ranging from slight to extremely severe, with 20 fatalities. The affection was essentially an irritation of the respiratory tract and other exposed mucous membranes. Particularly noteworthy was the direct relationship of both incidence and severity with increasing age. This observation has much meaning for us because of our increasing interest in geriatrics and our concern with any influences to which the elderly may be particularly susceptible. We were also searching for indications of pre-existing ailments; so we considered it highly significant that the fatalities had previous cardiorespiratory diseases.

Unanswered Questions

Although we are encouraged that these findings present a substantial body of data, we cannot but discern that they cast a long shadow of unanswered questions. The mass of data that we accumulated has succeeded in emphasizing just how few are the conclusions that can be drawn. We have now verified the acute health effects of air pollution, it is true, but no light has yet been shed on the long-range effects. We know the effects of acute exposure to concentrated contaminants under unusual meteorologic conditions but we must learn how the people's health is affected by continuous exposure to the usual concentrations under normal weather conditions, year in and year out.

In addition to determining the chronic effects on healthy people we must make a special study of the influence of air pollution on cardiacs, asthmatics and people with other respiratory diseases. As yet it is unknown whether air pollution only aggravates, or also causes the onset of respiratory diseases. Also, to what extent does damage to the respiratory system affect the cardiovascular system? We must get that answer, too. We must further ascertain the possible special effects of air pollution on children and on the elderly. Does the loss of sunlight lessen a child's resistance to disease? And, as I mentioned before, what about the aged? Science's conquest of the communicable diseases has enabled people to live to more advanced years. Now that their life span has been increased we must consider the effects of air pollution on this group and ensure that it is not a contributing factor to shortening their lives.

As one step toward answering all these questions, basic research is requisite to determine what concentrations of substances are necessary to produce either acute or chronic effects. We must also learn whether the air contaminants from industry—gases, fumes and particulate matter—always act singly on human beings, or act in combination, or act on each other to produce an agent which is more poisonous than any of the single substances or than the total acting in combination.

At present, values known as maximum allowable concentrations have been established for industrial environments where normal persons, excluding children and the aged, are exposed to in-plant contamination for eight hours a day. As yet we do not have comparable information for contaminants in the outside atmosphere affecting individuals of all ages and in all physiological and pathological conditions over a 24-hour-a-day period.

Knowing our present limitations we must, therefore, be wary in pushing for air pollution ordinances. The smoke abatement regulations in force in many cities are good as far as they go, but we should not develop legal standards for the control of other emissions until a more thorough study of the problem has been made.

As a result of the heightened interest in air pollution, numerous bills, ranging in scope and severity, have already been introduced in state legislatures throughout the country. Some states are feeling their way very carefully, first studying the problem. South Carolina, for instance, has authorized the creation of a committee to make a full and complete study of the needs and means for regulating and controlling smoke, soot, smog and other similar public nuisances in the state and to report back to the legislature on the results of the study, together with recommendations, within a specified period of time, On the other hand, some states are promoting full-scale air pollution prevention and abatement programs, some of which may be too rigorous. The bill proposed in New Jersey, for example, has so many restrictive provisions that industry has felt impelled to fight it. Such stringent measures are completely unrealistic in the face of the little actual knowledge available to date. Legislative concern is good, but we must move easily in the field of regulations.

However, that does not mean that industry has reason to delay in acting to correct the present situation. Even in the absence of clinical data, we can control the pollution to an effective degree by using proven industrial hygiene techniques. If we had waited all these years for clinical evidences of damage before instituting measures for the control of hazards in the working environment, industrial hygiene would still be in a primitive stage. Some occupational diseases have been known to run a course of as much as ten and more years before the worker recognizes, through subjective symptoms, that something is wrong and presents himself for diagnosis and treatment Fortunately we did not wait. We merely instituted the most practical engineering controls possible. Even though experience may later have proved that all these prophylactic actions were not clinically necessary, as long as they were feasible we went ahead with them.

Thus, the methods for the control of air pollution are already at hand. We are not in totally unexplored territory. Where the big challenge comes in, however, is to find *cheaper* methods of control. That is the challenging task confronting the engineer. Although workable in most instances, current methods of control

sometimes are either inadequate or too costly to perform the job of trapping contaminants. To illustrate the economic impracticality encountered at times, it is conceivable that a small plant with a capital investment of $50,000 would be required by a too-stringent law to spend more than its total assets to reduce atmospheric pollution with techniques in current use. Obviously, under such circumstances, a company would be forced to close its doors.

In the absence of suitable controls, plants may be required to move outside the city limits. This solution of course, leaves much to be desired for general application. It might be the answer in limited instances if there were stricter and better city planning and if industrial zones were established in areas where the factor of air pollution has been given serious consideration. Until we have rigid zoning, however, a company moving to an isolated location cannot assume that it has carte blanche to pollute the atmosphere and that it therefore need not install proper control measures. All too frequently it has been demonstrated that people move in and build around a plant. Then, regardless of the fact that the company was the first to move to that site, it is forced to take corrective steps by the pressure of public opinion. The wiser course of action by far would be to use the proverbial ounce of prevention and install proper safeguards at the outset. In a true exercise of foresight in selecting a site for new operations, industry should also give due consideration to the meteorologic conditions of a location as well as to transportation costs, availability of raw materials, personnel and other factors.

What CAN *Be Done Now*

By using available scientific techniques and apparatus, industry, the home and transportation and other sources of contamination can reduce their air pollution load despite the gaps in existing knowledge in this field. As you know from your own endeavors, progress is sometimes slow. Before the solution to a complex problem is seen in its entirety there is interim work on the phases that have been unravelled. So too with air pollution we can wrestle with the problem using the knowledge that we have at hand while at the same time we explore the unknown.

Let us see just what we have now in the way of tools to cope with this problem. Air contamination can be readily evaluated by a combination of air sampling with specifically designed scientific equipment and subsequent laboratory analyses. This procedure is followed on a quantitative scale, enabling determination as to the concentrations of contaminants that may be present. The Donora study employed these techniques and they will also be used in other surveys. As a result of the increasing interest in air pollution, new scientific methods and instruments are constantly being evolved. For instance, the Thomas recorder has been developed for the continuous determination of sulfur compounds in the atmosphere. The electron microscope has facilitated the identification and classification of particulate matter. In process of development are recording instruments to determine the halogens and the chlorinated hydrocarbons in the atmosphere. In the laboratory special equipment has been set up to indicate the reduction of ultra-violet rays and total sunlight when minute amounts of various contaminants are present in the atmosphere. Exposure chambers are now being employed to determine the effects on human beings of exposure to various concentrations of contaminants.

On the control side, I have already mentioned the smoke ordinances which are a sound basic step in the control of the smoke component of air pollution. Over and beyond these, as we have seen, emphasis must be placed on the need to control industrial emissions which do not lend themselves to that type of regulation. Here, too, various control techniques may be used effectively. The principle of dilution, using high stacks, some of which tower over 500 feet, may be employed. Or the answer may lie in conversion—as, for example, the complete combustion of gases to combat objectionable odors—or in collection. The latter technique utilizes a variety of principles and apparatus such as ultrasonics, electrostatic precipitators, steam precipitators, scrubbers, mechanical filters, centrifugal separators and gravity chambers. This variety of available measures ensures that, by and large, industrial emissions can be controlled although better tools may have to be developed in certain instances.

To elaborate on this point I should like to refer back to our Donora study. In complying with our recommendations the zinc plant, one of the chief contributors to the pollution load in the Donora area, has already gone forward in the control of the operations mainly responsible for contaminating the atmosphere. Furthermore, in order to be alerted to any impending adverse

weather conditions in time to take further precautions, the company has installed a teletype machine to receive daily U.S. Weather Bureau reports. All these actions will help to ensure that there is no repetition of the Donora crisis.

What Lies Ahead

The developments that I have traced for you thus far are also an intimation of what we may expect in the future. For, with the problem of air pollution, the present is not only prologue but also part and parcel of what lies ahead. The action which we are initiating or continuing now will be carried on in the future with what we hope will be increasing effectiveness. There is a compelling urgency for such activity for recent events have proven that air pollution is not a theory that can be shelved for a later, less busy day.

Since the intensive year-long investigation at Donora, the Public Health Service has been assisting the states on a consultative basis. We expect that additional funds will be made available to us so that we may move forward in air pollution studies which we are planning, as well as extend greater aid to the states with their problems. This activity, I should like to reiterate, will be in addition to, and of a different nature than, current smoke abatement efforts which must be continued.

Industrial hygienists in state and local official agencies are being informed of our work and in increasing numbers they are beginning to concern themselves with air pollution. These personnel are the best qualified to assume this responsibility because control of a'mospheric contaminants is only one step removed from their traditional function of controlling the working environment. By virtue of their position in health departments they are also able to bring all the state's health resources to bear on this problem.

While official agencies are engaged in these studies, industry must work on similar projects simultaneously. There is an obligat on upon all industry to conduct diligent research into the status of its own problem. Each industry should study thoroughly its particular operations to determine what processes emit pollutants into the air, as well as the nature and quantity of the contaminants. On this groundwork of data, industry can then base its research efforts to control the degree of pollution.

I realize, of course, that many plants embarked on such projects years ago and they are to be highly commended. Others, however, are hiding behind the skirts of the excuse that air pollution is either too vague or too overwhelming a problem.

Just as we have been shocked out of our apathy by the sad pollution of our waterways when that reached such alarming proportions, so too we must realize that the time has come that we can no longer spew contaminants into the air as a catch-all dilutant. With increased industrialization we cannot afford to be careless. We have already had one tragic example of what may happen when the weather goes bad on us. Additional research may also well discover insidious effects of every-day exposure to contaminants which may exact a toll on our vitality and well-being. Although we do not yet know the extent of the problem we have been dealt a sufficient body blow to recognize the danger.

The responsibility for the control of air pollution rests in a large part with engineers and the public will lean heavily on their efforts. I can think of no other problem confronting the engineering profession that demands more ingenuity or the taxing of all its resources, or which is fraught with more responsibility than the health of our people.

Photos by courtesy V.S.P.H.S.

investigations on *dust concentrations* in the granite industry

By Sarto R. Plamondon, B.A., Sc., C.E., S.M.
Division of Industrial Hygiene
Quebec Ministry of Health

It is well known that in cutting granite, dust containing a certain percentage of free silica is produced. Workers in this industry are therefore liable to develop silicosis if they inhale excessive amounts of this dust, hence the necessity of protection against it. Fortunately, there are highly efficient methods of local ventilation which cut down the amount of dust in the workrooms to a minimum.

However, in some cases dust samples must be collected in order that either the employer may be shown to what extent his employees are exposed to silica dusts or that the efficiency of the existing local ventilation system may be assessed.

Sampling Method

The first step in this sampling consists of collecting a sample of the stone for analysis to determine its free silica content. Then air samples are collected using the "midget impinger", an air sampling apparatus which yields satisfactory results. For counting the particles the Hatch cell is used along with the standard microscopic method, i.e., a magnification of 100 and a resolving power of about one micron.

The sampling time varies with the dust concentration resulting from the operation under observation. The sampling lasts at least three minutes in the case of the highest concentrations. When the concentration is lower the sampling may last in certain cases up to 15 minutes. Experience has shown that a sampling period of 15 minutes is sufficient with the type of apparatus used. Using the "midget impinger" which is manually operated, it is difficult for the operator to maintain a regular pumping rate when this time limit is exceeded.

Concentrations Obtained and their Significance

The types of granite found in various plants are of varying origin. Some granites come from quarries operated in the province, others are imported either from Europe or the United States.

The percentage of free silica contained in the various types of stone in use is determined by means of the x-ray diffraction apparatus. The percentages of free silica are found to vary between 25% and 45%. This determination makes it possible to assess to a certain degree the hazards of the stone in terms of silicosis incidence. However, the percentage of free silica in the stone is not necessarily representative of the free silica content of the dusts which the worker is liable to inhale.

The two following tables show the concentrations found in over 80 granite cutting establishments (granite cutting shops and quarries). For each operation the number of samples, the minimum and maximum concentrations found and the mean and the average concentrations are shown.

TABLE I

Dust Concentrations in Granite Shops

Type of operation	Number of samples	Concentrations in millions of particles per cubic feet of air			
		Min.	Max.	Mean	Average
Granite cutting (no ventilation) in a shop: pneumatic tool.	82	5.0	310.0	65.9	83.0
Granite cutting (no ventilation) in the open: pneumatic tool	7	12.3	106.4	38.8	46.1
Granite cutting with ventilation, inside: pneumatic tool	39	0.9	44.0	5.6	9.0
Surfacing without ventilation: pneumatic tool	6	24.0	354.0	56.3	101.5
Surfacing with ventilation: pneumatic tool	20	1.0	27.0	6.3	7.5
Hand polishing, without ventilation	3	4.4	46.3	13.0	21.3
Hand polishing with ventilation	3	2.1	5.4	4.9	4.2
Drilling, with pneumatic drill, with ventilation	5	1.0	11.9	2.1	4.7
Carving by sandblasting, without ventilation	2	27.0	124.0		75.0

Carving by sand-blasting, with ventilation	10	1.4	18.0	2.8	5.7
General atmosphere, ventilated operations	16	0.5	7.2	2.1	2.7
General atmosphere, non-ventilated operations	12	6.4	46.6	28.0	27.2

TABLE II

Dust Concentrations in Quarries, in Millions of Particles per cubic foot of Air

Drilling with manual pneumatic drill (no ventilation)	4	16.7–44.6	39.1	34.9
Drilling with manual pneumatic drill (no ventilation) 4 to 5 feet deep	2	10.5–10.7		10.6
Drilling (Plugger) (without exhaust pipe)	6	8.6–44.5	12.9	19.0
Drilling (Plugger) with exhaust pipe	9	24.5–110.0	46.2	56.8

It is noteworthy that the above tables show once more that local ventilation undoubtedly constitutes an efficient control for this type of work.

In the course of this investigation, air flow determinations were made at the level of the suction inlets. Table III compares for some cases the effect of the air flow at the level of the inlets with the concentrations found. Obviously the distance between suction inlet and the spot where the dust is produced must be taken into account. This investigation indicates that dust concentrations decrease considerably when the rate of flow at the suction inlet reaches 3250 feet per minute or more. Such a rate of air flow corresponds to an approximate volume of 350 cubic feet sucked into a ventilating pipe. These air flows were measured by means of an Alnor velocimeter and in some cases by means of a thermoanemometer. Table III shows the concentrations found in relation with the air flow rates.

TABLE III

Dust Concentrations at Suction Inlet in Relation to the Rate of Air Flow

Operation	Number of readings	Flow rate feet–min.	Concentrations in millions of particles–cu. ft. of air			
			Min.	Max.	Mean	Average
Granite cutting	4	560–3225	3.64	44.8	12.4	17.2
Granite cutting	13	3255–4900	1.00	11.6	3.5	5.2
Surfacing	7	900–2920	2.0	27.0	5.22	8.00
Surfacing	5	3250–4500	2.4	9.60	5.83	5.60

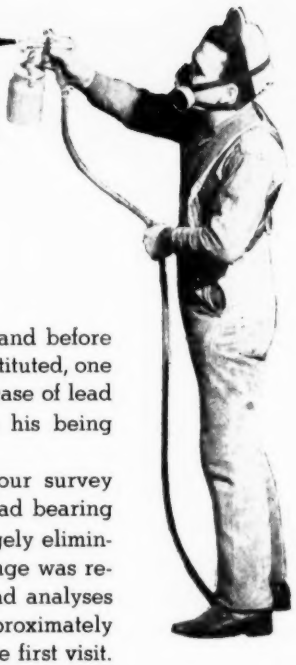
The above results are in close agreement with such data as are found in a pamphlet of the U.S. Bureau of Mines entitled *Review of literature of effects of breathing dusts with special reference to silicosis*. This pamphlet quotes from Bulletin No. 187 of the U.S. Public Health Service some results obtained in the course of an investigation which took place at Barré. In it may be found such conclusions as 614 granite cutters using a pneumatic tool were exposed to an average of 60 million dust particles per cubic feet of air; another group of 124 workers performing work other than granite cutting were exposed to concentrations of 27 to 44 million smoke particles; c) employees numbering 146 and exposed to the average conditions of the general atmosphere prevailing in the shops breathed air contaminated with 20 million dust particles per cubic foot of air. If those data are compared with the results we have obtained in cases where no ventilating system existed, the dust concentrations found are in fairly close agreement.

In the paper entitled *Survey of Cemetery Memorial Industry in Indiana* by H. G. Porter, Industrial Health Division, Health Buerau of the State of Indiana, the granite dust concentrations to which the workers were exposed are in fairly close agreement with those found in the course of our investigation.

The data given in this paper add nothing new to the present knowledge in industrial health; however, we are of the opinion that they will emphasis further the efficacy of a good local ventilation system in dust-producing operations in granite cutting establishments.

lead hazard

IN AN ENAMEL PLANT



By C.R. Ross, Industrial Hygiene Engineer
Department of Public Health
Province of Nova Scotia

As part of a routine survey into health hazards at a plant engaged in the manufacture of bath tubs and sinks lead exposures were evaluated at enamelling operations. Air and ma'erial samples were collected and urine samples were obtained from exposed workers.

The first step in the enamelling process at this plant consists of spraying clean iron castings with a base coat of enamel. After this coating dries it is fused by heating to a high temperature in batch-type ovens. Successive finish coats of dry enamel powder are then applied to the hot ware by means of hand-held, mechanically-vibrated sieves. The coating is fused after each application of enamel powder.

Air samples were collected by electrostatic precipitation. After these samples had been examined in the laboratory it was found that air concentrations of lead ranged from 3.3 to 10.3 milligrams per 10 cubic metres, with the average worker exposure to lead being of the order of 5 milligrams per 10 cubic metres. Although this exposure was considerably above the generally accepted safe concentration limit of 1.5. milligrams per 10 cubic metres, we did not feel that, in this plant, it represented a severe hazard because we had noted during our visit that the dust appeared to consist of rather large particles and to settle out very readily. During the time we were taking samples we had observed that relatively large amounts of dust accumulated on the instrument case and on the exterior surface of the sampling tubes. It appeared to us that a large part of the dust which we sampled consisted or irrespirable particles. On analysis of urine samples, however, it was found that workers were excreting abnormal quantities of lead. Urine samples were obtained from 21 workers during this first visit. Eleven of these 21 samples were found to contain more than 0.30 milligrams of lead per litre of urine, a level of excretion which is considered to be rather dangerous. Only four were found to contain less than 0.15 milligrams of lead per litre of urine, a level of excretion considered to be safe. Adequate precautions had been taken during sampling to guard against contamination. We therefore concluded that exposure to lead was of a serious nature and recommended that action be taken to reduce the exposure.

Subsequent to our visit and before control measures could be instituted, one employee developed a mild case of lead poisoning which resulted in his being off work for some weeks.

Some two months after our survey was completed, the use of lead bearing enamels at this plant was largely eliminated. The effect of this change was reflected in results of urine lead analyses which were continued at approximately monthly intervals following the first visit. The results of these tests are here summarized.

About one half of these urine samples were examined for coproporphyrin as well as lead. For this purpose we employed the semi-quantitative porphyrin test of de Langen and ten Berg (*Acta Medica Scandinavica* Vol. CXXX, fasc, I, 1948). Positive findings were noted in most samples containing more than 0.15 milligrams of lead per litre or urine. Our samples, however, were two to three days old before determinations were made and as the porphyrin decomposes on standing we did not feel that our results were reliable.

All lead determinations were made by a dithizone procedure essentially as described by Cholak, Hubbard and Burkey in *Analytical Chemistry 20*,.7671 (1948). Urine samples were wet ashed by the method of Winn, J., *Industrial Hygiene and Toxicology 27*, 6, 178, (1945).

Month	Number of Samples Examined	Milligrams of Lead per Litre of Urine Examined ABOVE 0.30	BELOW 0.15
1	21	11	4
2	19	9	8
3	23	11	7
LEAD EXPOSURE REDUCED AT THIS POINT			
4	24	9	5
5	21	9	5
6	23	1	13
7	22	2	10

By J. P. S. Cathcart, M.D. Chief Neuropsychiatrist
Department of Veterans Affairs, Ottawa

An ounce of prevention is worth a pound of cure

every human being is an individual

This is a case history of an office worker who in 16 years on the same job lost a whole year's working time (for which he received full pay) due to faulty supervision.

An alert plant physician or nurse, with fingers on the pulse of their industry, would have uncovered such an undesirable situation at a very early stage. The problem could then have been satisfactorily dealt with in its infancy, thereby saving the employer money and the worker and his family both money and much suffering.

THE CASE—

A harrassed and self-effacing looking man, a 54-year old civil servant, came to see me in September, 1949, at the request of his neighbor, a physician, who frequently drove him to town during the summer months and in that way had become familiar with the man's condition and difficulties. As he was an ex-soldier I was permitted to deal with him short of admission to hospital and, judging from the physician's description of the symptoms and history, it seemed that the case could be managed on an out-patient basis.

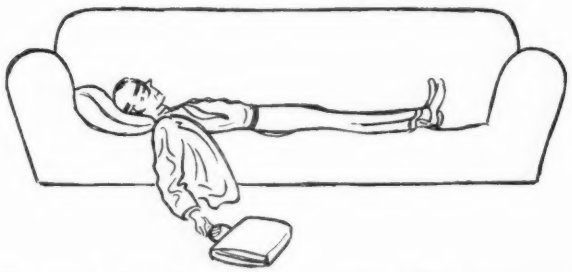
As the physician had indicated, he was in an anxious state, bordering on depression, of which there had been previous episodes, the first in 1933 shortly after coming into his present job and as I later learned, under his present boss. That attack lasted five or six weeks and he was off work for a couple of months. The subsequent attacks have been similar, with general tenseness, tight feeling in the head, blankness of thought, sleeplessness and, he added with a sickly grin and some hesitation, a fear of insanity. Later he indicated, in an unguarded moment, that in all the attacks there has been contemplation of suicide. The second attack developed two years ago and probably because of the hint of suicide he was given a brief course of electro-shock but without any psychotherapeutic approach or follow-up. When a third attack developed in June, 1949, the electric-shock therapy was repeated —a longer course this time and with temporary recovery but there has been a persistence of concern about memory difficulties which, of itself, tended to perpetuate the anxiety. In fact, the referring physician was beginning to be doubtful about a further course of electro-shock which had been contemplated and he insisted, as an alternative, that the patient come to see me. At least I could be counted on to make adequate inquiries into the personal history from the background of one familiar with the problems of ex-service men and civil servants. With each episode the patient had been off duty from two to three months; in fact his cumulative sick leave (three weeks per year), had been fully expended by the time he returned to work last August and that was another source of concern.

Recently he has been feeling panicky again, partly because of the persistent memory difficulty which he seemed to think resulted from the longer course of electric-shock, but mostly because of sensitiveness in his relations with his boss, a very exacting person who evidently dabbles frequently into the detail

work of his junior employees, criticizing and editing outgoing letters. Other employees have experienced the same treatment. Some have obtained transfers but the majority, like the patient, are hanging on, hopeful that something will happen to the boss by way of change

of heart or a visit from the grim reaper. Interestingly enough, the boss seems to be a kind enough fellow in his peculiar way, and is of course, very hard working himself. In fact he himself recently had a "nervous breakdown" and was off work for a couple of months during which time the branch did not seem to suffer.

My patient has an anxious look and is obviously ill at ease. He says he is beginning to feel desperate and feels that he will "go crazy" unless he can get relief. His sleep particularly is affected. He is often sleepless until three A.M., and is awake again at five which terminates his rest. Although the anxiety is colored by depression and self-depreciation there are no psychotic symptoms. In fact the patient is quite natural-like in discussion of various topics other than his history and symptoms. He is overly conscientious, perhaps perfectionistic, takes work home at night, has no hobbies, rarely takes a drink, has no energy or ambition to go out in the evenings and just lies down.



He has difficulty in thinking and, therefore, avoids social life, though I find him an interesting conversationalist but in need of a little prompting. He is married with three children living. Two sons were lost over Germany in 1944 within six months of each other. He says his wife was hardest hit by the loss whereas, when I saw her later, she told me that the reverse was true. She further indicated that "the trouble is all at the office. As soon as he started back to work this summer he got upset again." In a later conversation with the wife, after some improvement in the patient, she laughingly suggested that it might be due to the boss's absence, but that wasn't the whole story.

He came to see me three days later by appointment. He claims no improvement, awakens in the morning tired, dreary and apprehensive, dreads going to work but realizes that he is better off making the extra effort than staying at home fretting. He indicates that he is of little use at the office, his cerebration is slow, he can scarcely collect his thoughts and his memory is now very poor. In his work an agile memory is essential but a day never passes now without some embarrassing forgetfulness of things that he should remember. The memory difficulty frightens him and he fears "mental deterioration" and has dropped all interests other than his work. He goes home at night, lies down and scarcely talks to anyone. It is too much of an effort to keep up with a conversation.

A careful personal history at this time reveals very few background sources of conflict or anxiety and he claims to have been entirely well until 1933 when he was promoted to a position of greater responsibility though he felt himself equal to it, personally and educationally. However, he hadn't counted on an exacting boss who gave him no direct instructions regarding the new responsibility but merely criticized and edited his correspondence, sent back several letters, rudely bawled him out—a very harrowing experience during the first six months, all the more resented because during most of that time he was returning to work nights or taking work home, which latter he has continued to do, off and on, over the years.

In some respects my patient is rather lenient towards his boss and it is to his credit that he hasn't once mentioned the name or identified his position. He may be as much at fault as the boss; at any rate, each time he has been ill the boss has been rather sympathetic, telling him to take as much time off as he needs, and when he asked the boss the other day, at my suggestion, for time off to take a mid-morning walk for a cup of coffee, the boss gladly assented, yet he is soon back at his old tricks of interrupting my patient at his work by calling him into the office and permitting endless interruptions during his conversation. Often in that way my patient is uselessly away from his desk for an hour or two a day and then has to work overtime to catch up, or take work home. He is becoming more used to the boss's ways but otherwise the irritations continue and he definitely attributes all his breakdowns to that source and it is perhaps confirmatory that the first attack developed within six months of his coming under the thumb of his present boss. Each attack, he thinks, represents an accumulation of frustrations and irritations but there have been symptoms meanwhile which occurred, more or less continuously. For instance ever since the episode in 1933 he has been a light sleeper and at work he has frequently felt his scalp getting tight and for days at a time there has been difficulty in concentrating and he has felt jittery. The attack this June was not clearly due to the old difficulties with the boss as the latter had softened up considerably since being away himself for a few months two years ago. Meanwhile he has relaxed his excessive vigilance and turns over some responsibilities to subordinates. He seems more appreciative latterly of what the subordinates have done to maintain the production of the branch; has indicated to my patient that he can take things easy, etc., but the work of the branch happens to be fairly heavy this year and there has been much accumulation as a result of his sick leave absences.

When I saw the patient again the next day he was much improved and it was apparent that my suggestions to him how to handle the boss had given him an ego uplift or had been the means of improving the boss's attitude towards him. For the first time he was able

to laugh about some of the amusing aspects of that and his tension generally seemed to be lessening with a better understanding of what his problem has been. Taking advantage of his improvement, I had him recall again the days of 1933 when he was struggling along at the new task under the whip-lash of his boss's criticism. He tells me now that he was tense all the time, increasingly so in the continued expectation that the boss would ring for him. By the time he became ill he was in constant dread of this signal and that has become a sort of conditioned habit since, in spite of the great amelioration of the boss's attitude towards him.

It is now two weeks since I saw my patient but his doctor neighbor tells me that he has almost completely recovered and that he will have him 'phone me.

The case of this clerk is of interest from several points of view, but first the purely clinical aspects deserve some comment. The outstanding symptom is anxiety and the most appropriate diagnosis is probably that of an anxiety neurosis though it is usual to have more somatic symptom accompaniment. As is true anxiety neurosis, my patient was not immediately conscious of his anxiety but exploration of likely tender areas in the life history seemed to place the most accent on the immediate situation though that represented a more or less continuous harassment and conditioning over the past 16 years. I was expecting to find more evidence of neurotic traits in childhood and of parental tension or other background insecurity but this part of the total life history may yet reveal the explanation of the original sensitization and will certainly be further explored unless the present improvement and adjustment are maintained. It is of special interest that the patient is very modest in respect to his service in France with an infantry battalion and he raises no issue indicating emotional stress in two years at the front as a rifleman. He was not wounded or ill and was returned home on compassionate grounds in 1918 because of his father's death which was followed six months later by the death of his mother—a circumstance that contained a potential threat to his personal security—and yet there seemed to be no touchy aspects. Perhaps as in the case of his service at the front he had inner resources which enabled him to weather that stress.

For the present I am dealing with the patient on the basis that he has correctly assessed the major aspects of etiology, in which case I am faced with the necessity of desensitizing him towards his boss and the circumstances under which he works. It would be stupid to repeat the sick leave nonsense without more indications of incapacity, or threat of same. True, the vague reference to suicide contemplation put me on the alert, but to have acted on that possibility in the face of the patient's evident confidence in me would have simply piled my own panic on top of his. Sick leave with the idea of "rest" would have been futile; in fact rest and hospitalization can be disastrous in some cases of neurosis. Both add their own problems without commensurate advantages and fortunately my patient had insight enough to realize that whether on vacation or at work, at home or in hospital, he would still have to live with himself. He could do that more easily with a work outlet for his tensions though that same work brought him into the environment to which he was unduly sensitive.

My patient has no hobbies. For years he has come home tired, even exhausted, not from overwork, which is more often a symptom than a reality, but from his internal tensions arising out of accumulating resentment and frustration. I was able to interest him in a choice of hobbies. A neighbor has a hunting dog and needs company on his hikes. The same man goes deer hunting each fall and my patient saw possibilities of being added to the hunting party. Perhaps if he happens to plug an innocent deer his inhibited resentment will find an acceptable outlet.

I did not inquire but in all possibility his boss, too, has no hobby, a common failing in the civil service which the Recreational Association has been attempting to correct. There are demands for the shortening of the civil service week and similar demands are heard in respect to industry. What are these people to do with their increasing free time? There is a vast opportunity for discussion, education and experimentation in this field before the shorter week goes into effect. A man can survive longer working hours and overwork better than boredom and its accompaniments, mischief, alcoholism and hypochondriacal preoccupation.

As in my patient, all neuroses derive from the friction engendered in individuals through more or less continuous conflict between biologic drives or instincts and the pressure of a social system operating from infancy in the parental home, in the school, in the community and in industry, through rules, racial customs and ages-old traditions, and through such conditioning influences as pride, blame, reward and punishment. To remain normal and socially useful and acceptable, a man must adjust himself somewhat satisfactorily between these powerful opposing influences. If I have assessed correctly my patient's major conflict, it is likely he has been made acutely aware throughout the past 16 years that emotional and intellectual competence, and not seniority in service or other preferment, should be required of his supervisor; he is intelligent enough to think that higher management should do something to improve the situation, and has sufficient insight to realize that he himself should face the realities more courageously. He is inhibited from resigning by reason of 20 year's contributory service in a pension scheme. If his instinctive urges were operating without social or moral restraint they would prompt and perhaps allow him to drain off some of the resentment tension in the old jungle fashion, but that method and some others are "just not done" in modern society, and so frustration and resentment mount up. I could easily flood out his resentment by taking sides with him against his boss and the system, but that might leave his ego with no cushioning support and confuse his keen sense of right and wrong. Resentment should be handled very cautiously, and perhaps it should be left untouched by those who are not emotionally neutral in regard to it.

Another of the easy-looking solutions in such a case and very attractive-looking to those of little experience, is that of suggesting a transfer to another branch or department. Transfer would not solve this man's problem—in fact might seriously complicate it by compelling him to make a new work adjustment at a time when he is having difficulty coping with a job and boss with whom he has been associated for 16 years. There would always be the chance that the new supervisor would be difficult in some other way, due partly to my patient's own personality faults, of which the outstanding ones are perfectionism, sensitiveness and perhaps timidity, though there is less indication of the latter since improvement commenced. I have an idea too that his attitude towards the boss is a two-sided affair (ambivalent), which we frequently find in neurotics. It is my impression that he likes and hates his boss at the same time. He would be happy if he were more secure in the good graces of the boss, and certainly he was genuinely sorry that the boss had a nervous breakdown. He readily recognizes after therapeutic neutralization of his resentment that the boss probably means well and certainly is not work-shy himself nor even tyrannical, and on rare occasions when reminded he can be very considerate; and that his real fault is just not *understanding* the other individual and his personality.

Placement in a sinecure position for the time being would be no solution whatever to this intelligent, sensitive, conscientious employee. That would inevitably precipitate a collapse of his morale. He would too readily recognize that such a move would imply running away from his problem and his mere acquiescence in that would be a further reason for self-reproach, of which he has load enough already.

The other alternative in this case is one that is unfortunately out of my jurisdiction; in fact almost beyond my ethical reach. I am reminded, however, of a period during the 30's when the Departments of National Health and Pensions were combined and there was some sort of a family cooperation with other departments in respect to these problems in human relations. In those days it would have been possible to make a friendly and constructive contact either directly with the boss or through the respective personnel officer, rather than through a psychiatric consultant.

Like my patient, the boss is obviously suffering from some neurotic handicap, as evidenced by his fearful hesitancy to delegate work and responsibility to junior employees and his meticulous attention to minor details. His breakdown, like that of his employee, was entirely unnecessary and could no doubt have been avoided by the intervention of someone with psychiatric understanding and diplomacy. It is interesting to speculate what would have developed if the respective positions had been reversed. I can readily visualize my patient, particularly if untreated, running around like a scalded hen or even being submerged under the responsibilities of the senior position, yet he impresses me as having had, and perhaps he may still have, potentialities for handling personnel.

A special word about the boss himself and his personality and his neurotic-looking handicap—the picture is not unusual, but similar bosses do not frequently have breakdowns, perhaps because they are able to protect their precarious balance by "taking it out" on others either at home or at work. Of course, my assessment of the boss is second-hand and may need to be revised; in fact I have already modified it in the direction of contemplating treatment potentialities rather than demotion.

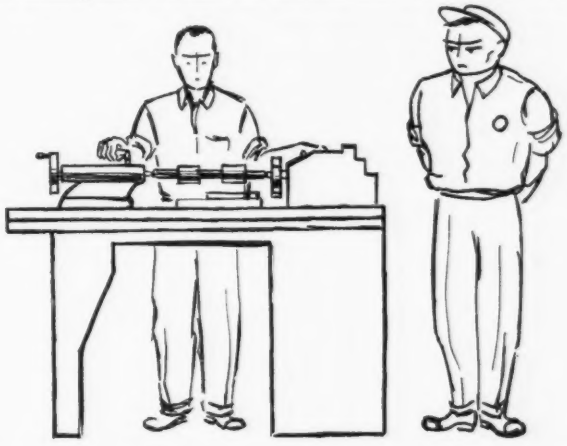
Similar problems of human relations in departments and generally throughout industry are perhaps more common than realized, though my earlier contacts, some of them multiple in the same department or division, pointed up more frequently such items as system rigidities, partiality, petty tyranny, etc. In those days we designated the resulting illness in its mildest forms as "civil servicitis". A proper industrial health service should be on the alert for such explanations within the whole organization or any part of it where there develops high employee turnover, increased morbidity in respect

of psychiatric or psychosomatic conditions, or the prolongation of invalidism from minor illness or injury. In such circumstances, it is likely that there is some key person in a responsible position in relation to subordinate staff whose emotional qualifications temporarily, or perhaps permanently, unfit him for the task though he may otherwise be fully qualified for the administrative or supervisory duty. I am old-fashioned enough to believe that employees are very appreciative of competent and understanding supervisors and even tolerant of a good deal less, particularly if they sense in the boss some harassments similar to their own. However, anxiety has some contagious aspects, both in the family constellation and a corporation, but perhaps it is less contagious amongst manual workers where there is opportunity to "work through" the neurosis.

The problem that I have illustrated here, of supervisor and clerk, or it might as well have been foreman and lathe-hand, or some level of top management and immediate or distant subordinates, has formidable possibilities of employee discontent, morbidity and inefficiency. Out of nearly 5,000,000 employed civilians in Canada at the latest estimate, there must be about 4,000,000 who work under supervision, and of these there are probably about 500,000 in a supervisory capacity. Let us consider the average number of hours these people are together each working day and it will then be apparent that Canadian industry as a whole represents a vast social relationship of worker-worker and worker-supervisor Add to these the families of employees and it will be evident that the group represents half of the population of Canada and contains within itself the potentials, not merely of immediate worker-satisfaction, but of the spreading influence of mental health to the whole community. A natural follow-through of putting into effect the idea of *preventing* unnecessary emotional tensions on the job is the all-round promotion of mental hygiene.

Of course, there is no obligation for industry to do the job that is really the responsibility of the individual citizen and of the community, but there are so many possibilities for mutual advantage between worker and industry and it would not be the first time that industry has pointed the way for the community. Certainly the industrial physician has been in the forefront of progressive social medicine in building a structure of goodwill and experience and at the same time promoting the theme of accident prevention and positive health. In this stage of our civilization the school and industrial worker groups provide the most promising and receptive fields for the accelerated evolution towards a higher standard of health and improved relations.

As an interesting sequence I should like to mention that this man dropped in to see me just as the above paper was going into the mail. "I'll tell you, Doctor, I had it out with my boss the day after I saw you last time. I asked if I could speak to him and explained that I had been afraid of him. He thought it was all nonsense and tried to shut me off by telling me I deserved a good kicking, but I insisted that he listen to me about what had been happening all through the years, particularly the first six months. He kept trying to pooh-pooh what I was saying, but I told him that I wasn't the only one who was afraid of him, that there were at least three others in the branch who were just as terrified. He finally listened to me but said it was all a big surprise to him and then ended up by remarking that we both needed a good kicking. Well, yes, I guess we did; anyway he has been a lot better since and the atmosphere around the branch has been better too.



A week ago he called me aside and told me confidentially that his assistant might be leaving, in which case he thought I should apply for the job and that he would be glad to recommend me. Well, no, I had opportunities like that before, but have been avoiding that kind of responsibility."

Nothing was said at this session about going deer hunting; in fact I think he has already shot his quota of big game for the season, and evidently the boss too has had his quota—of specific therapy.

Presented at the Conference on Industrial Nursing sponsored by McGill University in May 1950; and at the Convention of the Registered Nurses Association of Ontario, held in Toronto in April 1950.

changing concepts in *occupational health*

By K. C. Charron, M.D., Chief
Industrial Health Division
Department of National Health and Welfare

The history of industrial nursing in Canada extends over 40 years. It began in a small way as a family health service. Workmen's Compensation legislation changed the emphasis to emergency care. The subsequent development closely parallels the extension of industrial health services to a greater number of firms and covers a much wider scope of activity.

Industrial nursing is definitely established as a distinct branch of the nursing profession and is rapidly becoming part of the modern industrial structure. The formation of the Industrial Nurses' Section within the Registered Nurses' Association of Ontario is an important milestone in the development of industrial nursing in this province and in Canada. It is an indication that progress in industrial nursing is appreciated not only by the industrial nurses themselves but also by responsible leaders in the general field of nursing. It is a far cry from the first-aid service provided in the early days to the servicing of the total personality today or, as one writer described it, "from patches to prevention".

Changing concepts in occupational health have been brought about by several factors. Important among these are:

(1) The appreciation that preventive health practices can play an important part in increasing industrial efficiency and the recognition that industrial health services are an integral part of the total health program.

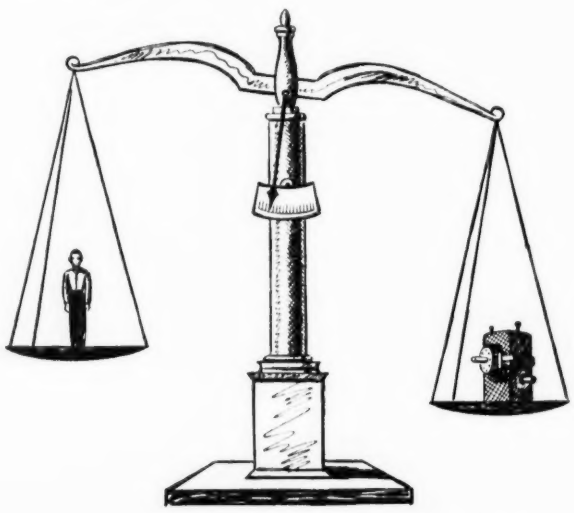
(2) The increasing complexity of modern industry with new substances, conditions and processes which, if uncontrolled, may affect health.

Preventive Medicine in Occupational Health and the Integration of Industrial Medical Services with the Public Health Program

With the advent of the machine age, emphasis tended to be placed on the machine rather than on the individual. It was a question of machine efficiency rather than individual efficiency and personal effort tended to be minimized. In recent years, however, the pendulum has begun to swing backward and the individual is again being appreciated. If it is necessary to select machines with care and see that they are properly maintained, it is more important to provide the same type of service for our working population. This includes top executives, supervisors, skilled and unskilled labor and, in fact, everyone in the industrial set-up. Industry recognizes that healthy, well-adjusted employees are essential to modern, competitive practice and hence we have an increase in industrial-medical services designed to improve and protect health.

The cornerstone of the modern industrial health service is the preplacement medical examination. It ensures that workers are physically and mentally suited to the particular occupation for which they are employed. It is a selective placement and will not exclude people from employment. On the contrary, it will allow even the severely handicapped to be properly employed where their abilities are stressed and their disabilities become less significant.

The proper placement of handicapped persons in useful employment will be of tremendous import to the individual and his family and will contribute much to the economy of the country. I recently had the privilege of visiting the Workmen's Compensation Convalescent Centre at Malton, D.V.A. rehabilitation centres and several rehabilitation units in the United States. The work of these organizations demonstrates that the



severely handicapped can be made self-supporting in most cases if they receive proper medical restoration, sound vocational guidance and, if necessary, special training and placement. The amputee, the paraplegic, the diabetic, the epileptic, the arrested tuberculosis case and so forth can, with proper treatment, play an important role in the economy of the country.

Nurses in industry will frequently be consulted by employees with some type of permanent disability and it is important that they learn the philosophy of the handicapped which is that, given a proper break, they are capable of taking their place as equals in the industrial set-up. However, they may have special problems and a competent plant nurse can help in the solution of many of their difficulties.

In addition, there is the problem of the older worker, which will increase in importance with our aging population. The industrial nurse, as a member of the medical team, will be called upon to give guidance in many complex situations affecting the health and happiness of workers. She must appreciate that guidance is not doing something *to* or *for* an individual—it is doing something *with* an individual.

Following selection for employment there is the problem of the maintenance of health at a high level. Industrial medical services accomplish this by periodic check-ups, health education, personnel counselling and group teaching. However, the individual at work cannot be separated from the individual at home or in the community and medical services in industry must be integrated with the total health program of the community, the province and the nation.

The control of communicable disease, industrial and domestic waste disposal, provision of a safe water supply, adequate housing, social and recreational facilities and various legislative measures adopted to ensure safe working conditions all play an important part in the maintenance of health. Hence, we see that the concept of a preventive health program in industry and its integration with general health services has developed along logical and well thought out lines.

Changes in Industry that Have Produced Specific Industrial Hazards

Modern industry is very complex and diversified. New substances, conditions and processes are continually being introduced. A change in process or the introduction of a new substance may create a new occupational hazard or may vary the degree of exposure to one which already exists. However, it should be emphasized that most of these materials and conditions can be employed with safety if proper control is established. Lack of knowledge on toxicity, inadequate control measures or carelessness may lead to excessive exposure with a resulting occupational illness.

The industrial nurse should know the industry in which she works. She should be familiar with the products, by-products and physical conditions which may affect health. She should understand the various medical, engineering and nursing techniques used in the control of industrial hazards. In addition, the nurse in industry should have some knowledge of the signs and symptoms produced by excessive exposure. This will permit her to be on the lookout for illness which may be of occupational origin and allow her to make a better disposition of the case.

Except in cases of extreme exposure, the onset of occupational disease is usually slow and insidious and early symptoms are frequently indefinite and may be delayed for some time after exposure. The disease may affect many organs and simulate other illnesses. In fact it has been said that in this respect occupational diseases take second place to none, not even syphilis.

The early diagnosis of occupational disease is important not only to the worker himself but frequently to his fellow workers and to his employer. For example, if a worker is suffering from lead poisoning, others in the plant may be similarly exposed and the exposure is likely to continue until a diagnosis has been made. Disability in the exposed group will frequently have an adverse effect on production. In addition, a workman is entitled to compensation if he is suffering from a disease arising from or out of his employment.

A few examples of recent trends may help to highlight the types of exposure that may occur in modern industry.

Occupational Dermatoses

Occupational dermatoses are considered to be responsible for more than 60% of all occupational illness. One experienced authority has stated that surveys of factories indicate that more than one per cent of all workers are suffering from occupational dermatoses at the time of the examination and the annual cost in lost time, expenses for medical care and compensation for these complaints runs into millions of dollars.

The most frequent causes of industrial dermatitis are oils and greases, solvents, acids and alkalis, paints and harsh cleansing agents. However, occupational dermatoses may be produced by a great many chemicals which act as primary irritants or sensitizers and by mechanical and physical skin irritation. In fact, they may occur in practically any industry or occupation.

Personal cleanliness and good housekeeping in the plant are most important measures in preventing occupational skin disease and properly designed protective clothing is also of great value. The industrial nurse who understands the problem can do much to encourage personal and plant cleanliness and see that proper protective clothing is available, worn and frequently cleaned. Protective creams and lotions may be necessary and ordinary wool fat is one of the best as an all-purpose cream. Harsh cleansing agents, gritty soaps, turpentine and degreasing solutions should be avoided.

Industrial Solvents

A few years ago only a few substances were classed as industrial solvents. Now these materials are numbered in the hundreds. They are used to remove undesirable matter from objects and to dissolve other solids or liquids without themselves undergoing a change. Most industries use solvents at some stage in their process and these same chemicals are also used in the home. It must be remembered that toxic constituents in solvent mixtures are frequently disguised by trade names.

Common solvents used in industry can be classified into groups. These include:

Aromatic hydrocarbons—benzene, xylol, toluol

Chlorinated hydrocarbons—carbon tetrachloride and trichlorethylene.

Petroleum products—gasoline and benzine

Alcohols—methyl, ethyl, etc.

Esters—ethyl, amyl (banana oil) and butyl acetate

Ketones—acetone

Miscellaneous groups—turpentine and carbon disulphide, etc.

Benzene is an excellent solvent for a wide variety of substances, but is very toxic and has resulted in numerous fatalities. Carbon tetrachloride is widely used in industry. It is also highly toxic, producing acute illness with varied effects ranging from dizziness, headache and fatigue to severe kidney and liver damage and death. Solvents derived from petroleum have a low toxicity but present a serious fire hazard. Alcohols and esters are used as lacquer thinners and are of moderate toxicity. They are used frequently in spray painting operations and all such operations must be provided with exhaust ventilation. Ketones are of fairly low toxicity. Carbon disulphide is extremely dangerous, both as regards health and as a fire hazard. Turpentine is widely used in painting operations. It is an irritating substance and its use requires adequate ventilation.

Solvents may enter the body by inhalation, ingestion and in some cases by skin absorption, but usually the most important portal of entry is by inhalation. Symptoms produced by an exposure to small or moderate concentrations of many solvent vapors are fatigue, lassitude or irritability, headache, gastro-intestinal disturbances, dizziness, precordial pain and palpitation. Unusual fatigue is prominent in most cases. These symptoms are a general physiological reaction and the more specific picture elicited by the particular substance may not become apparent for weeks or even months unless the exposure is heavy. Exposures to high concentration usually depress the nervous system. Fat solvents remove the natural oil from the skin and may produce a skin eruption. Certain solvents are also flammable and may cause fire or an explosion.

The method of use of these materials is important. On a small surface the amount of solvent volatilized is negligible but when spread over a wide area the concentration of the material may rapidly increase to dangerous levels.

The weather may play an important part in the degree of exposure to solvent materials. During warm weather, jobs requiring solvents may be done outdoors or with windows and doors wide open. However, when the cold weather commences the process may be moved indoors and windows and doors will be closed. Ventilation may not be adequate and a dangerous amount of the solvent vapor may result. Winter months may also bring an increase in dermatitis caused by solvents because of the increase in dry, chapped skin.

Metal Poisoning

Many new industrial processes call for an increasing use of certain metals and, if uncontrolled, symptoms of metal poisoning may result. Lead is a most versatile metal and is used in hundreds of industrial processes. Mercury, manganese, selenium, tellurium, beryllium and cadmium are being used with greater frequency and toxic symptoms have been reported from their use.

I am sure that you are all familiar with the recent publicity given beryllium in connection with the disposal of used fluorescent bulbs. The beryllium phosphor was used to coat the inside of the bulb and the disposal of burned out tubes created a public, as well as an industrial health hazard. The use of this phosphor has now been discontinued but beryllium coated tubes will remain until stockpiles have been used up.

Cadmium is being used widely as a protective coating for steel and other metals, in bearings, in certain solders, in pigments and in chemicals. Poisoning from cadmium most frequently occurs by the inhalation of fumes caused in firing or welding metal containing cadmium.

Recently we had occasion to investigate a complaint of garlic breath caused by tellurium.

Other trends might be mentioned. In agricultural provinces the hazards associated with the new insecticides present a problem as some of these compounds are highly toxic to human beings and are widely used on farms, orchards and home gardens. Even experienced toxicologists are confused by the rapidity with which these insecticides appear and disappear from the market. Industry is also showing an increasing interest in the use of radioactive materials. The textile, paper and printing industries are commencing to use radium in ionotron foil as static eliminators, and experience indicates that these installations may produce a health hazard. There are, of course, many of changes in modern industry which may affect health, but the few mentioned may highlight the need for special advising on adequate knowledge as a prerequisite to control.

The appraisal and control of these specific health hazards in industry resolves itself into:

(1) The appraisal and control of the individual
(2) The appraisal and control of the working environment

Physicians and nurses are concerned with the former and chemists, engineers, safety supervisors and others assist with the latter. In order to assist medical and nursing personnel in dealing with these specific health problems of industry and to supplement the facilities provided in the plant and the community, industrial health units have been established in several of the provinces and the federal government maintains a division of industrial health and an industrial health laboratory. These official agencies are staffed and equipped to assist with medical and nursing problems and to carry out surveys of the working environment. In no other branch of medicine or nursing is teamwork so essential to success. It involves the cooperative effort of personnel in many professions and the application of numerous techniques. Thus we see that changes in the modern industrial structure have presented new and challenging problems for the industrial nurse.

Industrial nurses realize that the widening scope of the industrial health program makes it imperative for the nurse in industry to be well trained in many fields. Although there are features of industrial nursing common to other groups, there are many aspects which pertain to industrial nursing alone. Subjects such as industrial relations and development, business and labor law, industrial toxicology and hygiene, medical records in industry, plant organization and related subjects are all important adjuncts for nurses in industry.

The responsibility for leadership in this field should rest largely with the industrial nurses themselves. They in turn, having accepted this responsibility, must see that industry is provided with competent, well-trained nurses capable of maintaining a nursing service which will compare favorably with that provided in any other field.

a consideration of basic *personnel policies* for industrial nurses

Mildred I. Walker, M.A., R.N.
Senior Nursing Consultant
Industrial Health Division
Department of National Health and Welfare

The pioneer days of industrial nursing have passed and now in modern industry the nurse is accepted as an integral part of the health and welfare services for employees at their place of work. In the beginning there were no nursing patterns and no guideposts such as the well-defined personnel policies as we know them today. The nurse made a place for herself and proved the value of her services to management and labor. These services are now on the threshold of a great expansion into the broader concepts of occupational health. This will bring more nurses into areas of larger patterns creating greater interdependence. This, coupled with the scarcity of qualified nursing personnel, demands conservation of effort. Personnel policies based on recognized principles operate in the field of personnel administration to assist in charting a course for good employee relations with a view to obtaining maximum production with a minimum of effort and a proper regard for the well-being of each individual.

It requires a mature person to be a good industrial nurse in present industry. She needs self-discipline but she also needs written personnel policies to assist her to know her place on the organization chart and to operate smoothly within the lines of communication. The nurse is a strong force in building friendly relationships within industry. To assist the nurse written policies should pass between the employer and the nurse in the pre-employment phase.

Requests have also been received from management, especially personnel directors, for guides to assist in setting up policies which will lead to satisfactory personnel practices for the nurse in industry. In the provincial and federal departments of industrial health assistance on a consultant basis is available to help in formulating policies. Some principles are suggested here to guide management and the nurses in this challenging field of service.

When the nurse considers a position in an industry the personnel officer should outline the status of the staff of the health service in relation to the total personnel chart. (1) The nurse should know to whom she is responsible. There will be some areas in which she is guided by the physician while in others some person in management should advise. (2) Salary rates and the policy of increases for recognition of good services should be defined. (3) The hours of work should be understood but where it is necessary to meet an overtime program, plans with the nurse should be made in advance and remuneration compatible with the company's policies should be given. There are times when

the supervising nurse may need to rotate her own hours to meet an emergency but this is advisable because it is her responsibility to see that the service is covered. It also gives her an opportunity to know what working conditions exist on that particular shift. Nurses are accustomed in their hospital experience to keep their service covered in the interest of the patient and this will carry over into industry, but a policy should be outlined to guide both management and the nurse. (4) Security measures for the industry should be stated clearly. (5) The working conditions for the health service should reflect the principles of a healthful environment, such as adequate equipment for aseptic technique in a heavy industry, space for efficiency to meet the expanding health program, lighting, ventilation, arrangements for maintenance and a cleaning service for the health centre. (6) Policies should be outlined for the selection of staff for the health service, such as qualifications for appointments, promotions, transfers (if there are other units) and recognition for adequate nursing service on the staff level as well as the supervisor. These should be compatible with the company's policies as well as the prevailing professional policies. (7) Stability of employment should be carefully considered as the nurse is accustomed to a profession which is geared to a continuous flow of service in hospitals and health agencies. There should be a policy to cover lack of work in the health centre due to lack of employees in the plant following a shut-down, strike or walk-out and any other situations which affect the flow of work in the health centre. (8) Policies should cover vacations, sick and compassionate leave, arrangements to attend professional meetings and opportunities for professional upgrading through educational programs planned for the industrial nurse. This should be planned by management in relation to other technical personnel. (9) Company sick benefits and retirement plans should include the nurse as an employee. (10) Service to uniforms, such as laundry, should be discussed.

Written personnel policies are an accepted principle in personnel administration. In large companies where the lines of communication are lengthy, these are essential. In small companies where the general manager and personnel officer are readily available to the health office to discuss problems which arise, written policies are not as frequent. However, it is important for the nurse to have a letter of acceptance in which the main items of employment are stated. From there on much depends upon the methods of administration within the company especially the adaptability of the nurse to industry and the industry to the nursing service.

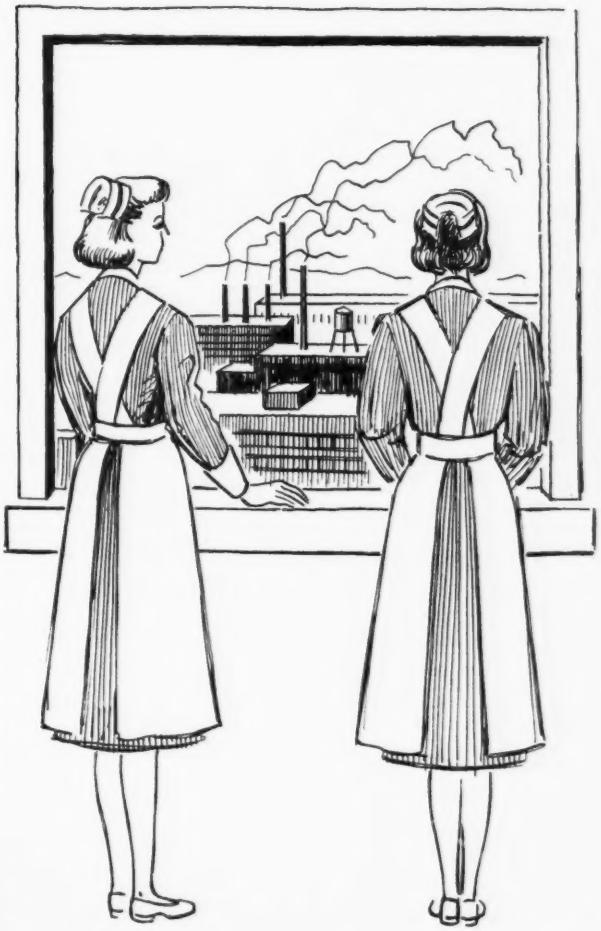
Good personnel policies are flexible and should be reviewed frequently (usually at stated intervals). Changes which are made should be in writing. In many administrations the personnel affected are given an opportunity to make suggestions regarding the changes. It is recognized that everyone wants to be in the know, especially when the policies affect their way of life. An administration needs to discuss policies affecting its nurses, so there will be compatability with the professional requirements of nursing.

The lines of communication should be clearly defined. The nurse should know to whom she is responsible for the supervision of the health service. These lines will be swift and direct at times when an accident occurs or when an employee's welfare is at stake. She must know the organization chart to understand (a) her personal direction, and (b) the direction and authority in the welfare of an employee. She must not confuse one with the other. She will maintain the ethical approach regarding medical information and in case of a severe accident she should consider the integrity of the injured person as a patient and as an employee of the particular industry. Her foremost responsibility to him as an injured worker is that of a patient.

Membership should be avoided in any organization within the industry which will make the nurse discriminate against one or another group of employees. She must be free to remain neutral and objective. She must not be placed in a position where she will divulge information regarding an employee which came to her through her nursing status. The neutrality of the health centre, carefully cherished by the physician and nurses, is one of the real strengths of the health service in industry. So often in times of tension the health centre is the neutral spot where emotional pressure is released and a calmer, more serene employee goes back to his place of work or to a meeting. Here the nurse uses her full skill as a wise professional counselor. Mention should be made of recreational activities. Participation in these activities is desirable so far as it does not make excessive demands on off-duty time and she has freedom of choice of recreation.

Personnel policies for a nursing staff should be compatible with those of the industry but should also have a uniformity in relation to the policies outlined by the professional nursing organization. These should be known to management and to the industrial physician. As an example of this the industrial health division of the Ontario Department of Health has suggested titles and definitions for industrial nursing positions in Ontario. This makes a uniformity and understanding of nurses' positions from one industry to another. In British Columbia the professional association of nurses has outlined excellent personnel policies for its members which are reviewed and brought up-to-date yearly by the members of the association.

Successful administration of an industrial nursing program is dependent upon well-qualified professional personnel in charge of its activities. This means there should be medical guidance by a full-time or part-time physician and where there is more than one nurse, there should be one designated as supervisor who accepts the responsibilities and carries the status of supervisor or senior nurse acceptable within the pattern of the industry. In Ontario a large number of industrial nursing services are one-nurse services and it is recommended by nursing consultants in that province that in the one-nurse service, the classification be that of a senior nurse.



In industrial relations the nurse needs wise guidance from management. A mature nurse will adjust quickly to this service which may follow many principles learned in a hospital but which also has its specific demands. The nurse learns quickly because the successful industrial nurse has social intelligence as well as professional ability. The pioneer nurse worked alone but today, as industrial health broadens its concepts to that of occupational health, the number of nurses will increase. This, because of a scarcity of qualified nurses, makes it necessary for all nurses to consolidate their efforts in all policies which will help clarify the place of the professional nursing employee in industry, making her more valuable to the industry. They will clarify the value of the industrial nurse to other nursing services by outlining her status and responsibilities to nursing in general and to occupational health in particular. Provincial and federal consultants with the overall viewpoint in industrial health are ready and willing to assist in building efficient health services to Canadian citizens at their place of work through conferences with management and the personnel in industrial health services.

Edmond Cloutier, C.M.G., B.A., L.Ph.
King's Printer and Controller of Stationery, Ottawa
1950